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By The House Committee on Administration

STATEMENT OF:

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BEFORE THE HOUSE COMMITTEE ON ADMINISTRATION

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Mr. Chairman, members of the committee, thank you for the opportunity to appear before the House Committee on Administration. My name is Dr. Keith Still and I am President of Crowd Dynamics, a Capita Symonds Group, Ltd company.

My testimony today will focus chiefly on our large body of work in the development of methodologies to secure the safe and effective evacuation of public buildings and facilities as well as the management and movement of large crowds under difficult and complex circumstances and conditions.

The Methodology

The collection of tools and strategies that we will be discussing is today is collectively known as "Crowd Dynamics." The Crowd Dynamics technique is presently a key part of the curriculum of the United Kingdom's Emergency Planning College which is a core component of the Civil Contingencies Secretariat of the Cabinet Office. Since 1989, it has been the United Kingdom's centre of excellence for running seminars, workshops and courses on an inter-agency basis in the areas of crisis management and emergency planning to over 6000 public safety and emergency service planners each year

While extremely valuable for public safety providers, it is important to note that crowd safety is primarily a 'management responsibility' and as such requires the application of the best practices of both health and safety management. For those managers who oversee both public and private facilities, organize events, or simply manage places that attract large crowds, they must have a health and safety management system, which both anticipates monitors and controls potential crowding risks.

Because venues, both fixed and transient, are large and complex spaces, the management of crowds contained within those venues requires extraordinary integration and communication. Communications and co-ordination between those responsible for the overall operation and those managing crowds face to face must be constant. Effective teamwork depends on senior managers providing a positive and pro-active safety culture so that staff at all levels are aware of the importance of crowd safety. In particular, the team needs:

- Clear roles and responsibilities;
- Written arrangements for the regular analysis, planning, inspection, operation and review of crowd safety systems;
- Adequate training.

The day-to-day management of crowds carries with it great responsibility. Preventing the unexpected from becoming a disaster depends on good management systems and experience. Between them, members of the crowd safety team should:

- Research the type of visitor they expect and anticipate likely crowd behavior;
- If it is available, collate and assess information about the health and safety record of previous events at the venue;

- Conduct a risk assessment to decide the adequacy of arrangements in place to control crowds and change them if necessary;
- Inspect the venue and review crowd safety arrangements at regular intervals;
- Set targets for crowd management (for example, if queues extend past a particular point, open another service point);
- Liaise with outside organizations such as police and the emergency services.

Risk Assessment:

When assessing the risks to crowd safety in a venue, both physical and behavioral factors need to be considered. The layout of the venue, design of circulation routes, and the design and location of emergency facilities can have a fundamental influence on crowd behavior.

For example, small entrances or a limited number of turnstiles may control crowd flow into cramped areas, but may result in dangerous build-ups on the other side of the turnstiles in an emergency. Barriers can direct crowd flows and the shrewd location of desirable facilities can help spread visitors more evenly. It may not always be possible to change the layout to enhance safety, but it should always be considered as an option. Likewise, familiarity may place a role in crowd dynamics.

Visitors familiar with a venue are more likely to use known routes to favorite viewing-points or attractions and may persist in doing this, even if the routes are closed. Those who do not know a venue may block routes while deciding which way to go and well-placed signs and information about attractions can help them decide quickly. In an emergency people often leave by the way they know best, even if it appears more dangerous. However, proper communications is vital.

Our studies show that clear signposts and simple, audible public address messages are crucial in crowd management and evacuation. Poor communications can lead to people stopping, moving against the flow of the crowd, blocking passages or making frequent and distracting demands on staff for directions. Visitors without information, or given contradictory information, can become frustrated and aggressive. These types of situations can be averted with proper implementation of technology and communications when properly planned and managed.

Crowd Types and Dynamics

Different types of crowds behave in different ways. Shoppers in a crowded mall each with their own interests, make up a different type of crowd than spectators at a large sports stadium. Therefore, it is important to know the age-range and social mix of visitors to accurately anticipate probable behavior and make appropriate management decisions regarding crowd management.

Individuals within a crowd usually behave in a rational and goal-orientated manner. For example, someone whose aim is to watch an event or celebrity may climb onto a roof or to the top of scaffold poles to get a better view, despite the danger. Other spectators with a similar aim may follow, leading to more people on the roof and the possibility of collapse and injury. A risk assessment should pick up the

likelihood of this happening and enable adequate measures to be taken before the event.

Crowd Dynamics addresses this type of situation and provides planners with the tools to study how people move and interact with others and their surroundings. It takes into account such factors as:

- Pedestrian & Crowd Movement – how much space do people occupy? How does the crowd affect how people walk?
- Human Factors – how do people behave and respond to information or the conditions around them
- Spatial Analysis – how does the layout of a location influence movement?
- Queuing – why do queues build up? What are the consequences of safety?

Crowd Dynamics can be also be applied to any place where people assemble or move. It is relevant to multi-venue public spaces such as airports, maritime ports, a central business district, city-centers, government centers. Crowd dynamics are also important for specialized sites such as stadiums, arenas, transit and railroad stations, events large and small, marches, religious festivals, and super-events such as the Olympics where public and private sector managers must work together to provide for the safe management of large numbers of people.

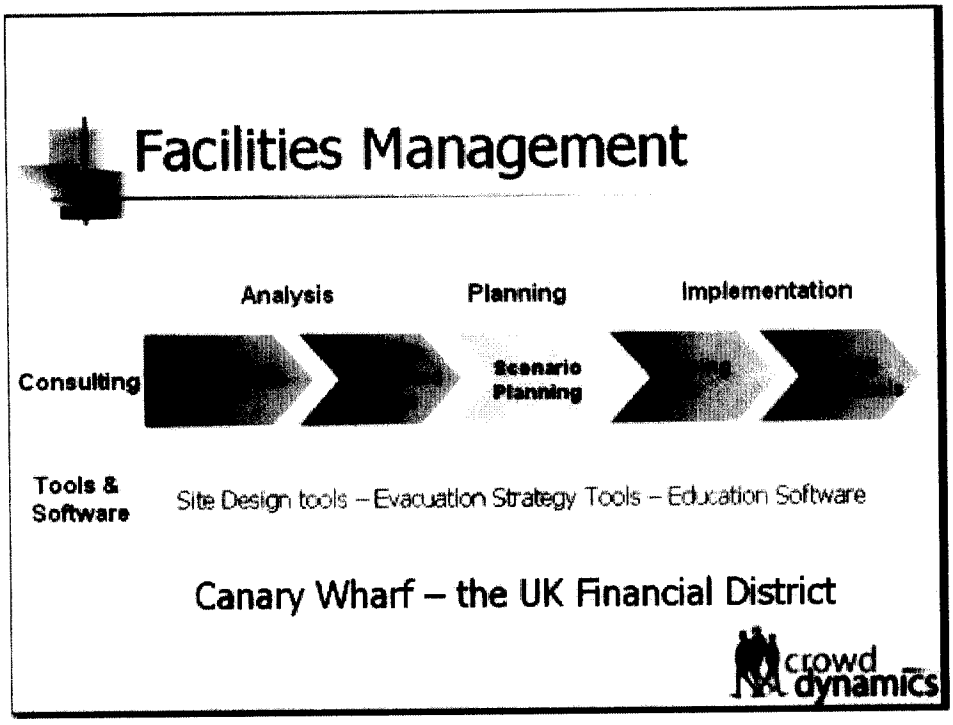
By way of comparison, the United States Capital Complex is roughly similar to London's Canary Wharf. Canary Wharf -- one of Europe's most vibrant, dynamic business districts. It extends over 86 acres with over 6 million sq. feet of office and retail space, and contains over 55,000 people workers.

In the case of Canary Wharf, managers and planners needed a tool to provide a common basis for occupant management of the Canary Wharf estate. They needed tools to develop compatible responses to various security and safety related threats and provide solutions to potential incidents.

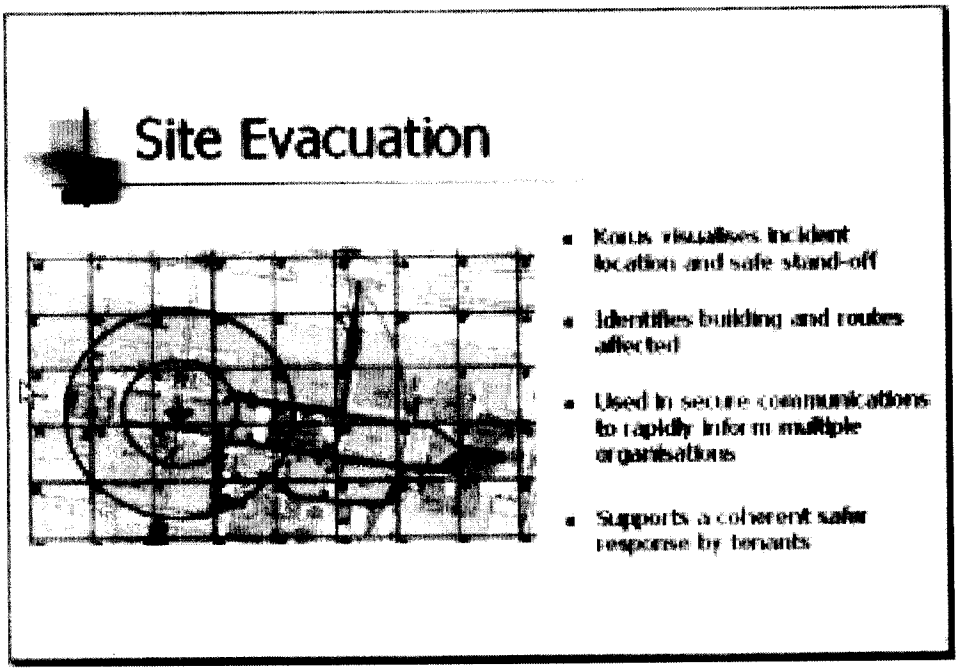
While the Canary Wharf estate currently has 60,000 staff employed in the development, a robust tool capable of dealing with crowds of over 100,000 has been developed in conjunction with the Wharfs major business tenants. Primary activity associated with the planning of the evacuation strategy for this facility included:

- Site audit to identify evacuation routes, capacities, and local hazards
- Modeling of evacuation capacity and demand
- Plans for mass and partial directed evacuations

Employee and management training are key elements for success in any program dealing with crowd dynamics. Adequate training of employees is crucial for the successful evacuation of any large scale crowd in a confined area or space. This was particularly true on the Canary Wharf project where crowd communication spread across a large area was critical in time of emergency.



Crowd Dynamics supported this need by developing procedures known as KORDON and KORUS, Evacuation Planning and Operations tools and training tools to help all employees familiarize themselves with evacuation routes off the facility and beyond.



In summary, all of these technologies are important elements in the successful measures taken on by the government of the UK in dealing with eventualities in times of emergency or response to terrorism.

As a leading provider of highly sophisticated solutions to large area security and crowd management, Crowd Management and Capita Symonds, has advised several world municipalities. We have provided technical and consulting solutions for public and private organizations and facilities. From the Sydney Olympics, to Wembley Stadium, to the millions each year who travel to the Hajj pilgrimage at Mecca, our models and experience have taught us that proper and focused crowd management is indeed possible.

Post 9-11 Application:

Since September 11, th evacuation planning has become a central consideration for many organizations. Our evacuation strategies group has developed leading-edge methodologies and tools to help organizations plan for the new threats and implement the new responses needed.

Specifically, Crowd Dynamics uses expertise and mathematical models and simulations to analyse crowd issues and venue design. For existing environments such as the United States Capital Complex, the approach begins with observation and analysis of the traffic flow and crowd levels during various seasons and conditions. Once that data is collected, specific models or simulations would be selected to determine the best possible, most cost-effective approach in providing secure and safe evacuation of the complex in time of emergency.

In conclusion, it is important to remember that safe and orderly crowd management is achieved only through careful planning and study. Crowd modelling is essential and critical in any venue where public safety and evacuation must be addressed. Crowd Dynamics is pleased to have been the provider of these solutions worldwide and we are happy to take any questions you may have on our technologies and models at this time.